INVENTIONS & INNOVATION

Success Story

DIRECT SOURCE TO OBJECT RADIANT HEATING PANELS

Benefits

- Can reduce heating costs by more than 50% compared with baseboard electric-resistance systems and by more than 30% compared with conventional heat pump heating
- Provided cumulative energy savings of 1.45 trillion Btu nationwide through 2000
- Avoided almost $1.9 million in electricity purchases nationwide through 2000
- Avoided almost 97,000 tons of CO_2 emissions through 2000

Applications

This individually controlled work–space-heating system replaces individual electric resistance heaters, complements central space-heating systems, and installs as the primary heating system for buildings and manufacturing facilities.

"The I and I grant helped us verify the claim that radiant heating allows rooms to be maintained at temperatures 6 degrees F to 8 degrees F cooler with the same comfort level as rooms with convection heating."

– Richard Watson
Solid State Heating Corporation, Inc.

Radiant Heating Panel Significantly Reduces Space Heating Costs

In the United States, the most common forms of residential heating systems are based on convection with air as a heat transfer medium. Convection heating systems require dedicated wiring and forced-air ventilation systems. By contrast, radiant heating systems transfer heat directly to a person or object in a manner similar to sunlight, eliminating mechanical heat-delivery requirements. Radiant heating allows building designers to lower the space-heating requirement for the whole structure and eliminates the need to heat unoccupied areas. When the unit is energized, comfort is felt immediately even though room temperature is lowered to conserve energy.

Under a grant from the U.S. Department of Energy's (DOE's) Inventions and Innovation Program, Solid State Heating Corporation, Inc., commercialized a flat, lightweight radiant heating panel that directly mounts to walls or ceilings without expensive mounting brackets. The radiant heating panel includes a steel or aluminum casing, an insulated back, and a front surface that readily transmits infrared radiation from a patented electric-heating element. The heating element consists of two electrodes that deliver electricity to conductive material laminated between two layers of polyester film or a solid state heating element.

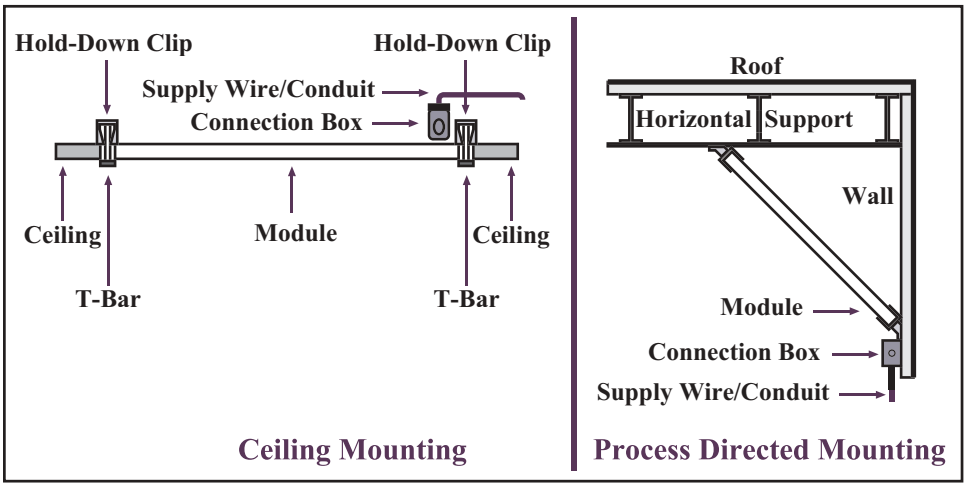
Direct Source to Object Radiant Heating Panel

System Benefits and Market Potential

Solid State Heating Corporation, Inc., has been selling the ENERJOY® radiant heating panels since 1981. The company now offers two models of radiant panels: the ENERJOY I and II. Almost 400,000 panels have been sold.

The average panel heats about 100 sq. ft. and displaces about 680,000 Btu during the heating year. With a 52% saving per panel, the total savings is 350,000 Btu per panel per heating year or 0.14 trillion Btu per year for 400,000 panels in the year 2000. Cumulative energy savings since 1981 have totaled 1.45 trillion Btu, which represents $1.9 million in avoided electricity purchases. The associated cumulative reduction in CO_2 emissions is over 97 thousand tons. Cumulative energy savings are projected to grow to almost 4 trillion Btu by the year 2010. Similarly, almost 250 thousands tons of CO_2 emissions will be avoided by 2010.

Marketing efforts for the technology are continuing. Solid State Heating Corporation, Inc., supplies panels to both the residential and commercial markets, and the manufactured home market looks promising. The technology is also suitable for clean rooms, which require a dust-free environment, because it can eliminate the need for forced-air or hydronic heating systems with associated contaminates. The product can help address escalating energy prices and localized power shortages. A 100-watt underdesk heating panel can replace a 1500-watt convection heater that is plugged into the wall. A 100-watt underdesk heading panel can maintain room warmth after business hours, when the central system is in setback mode.



Inventions and Innovation Program

The Inventions and Innovation Program provides financial assistance for establishing technical performance and conducting early development of innovative ideas and inventions. Ideas that have a significant energy-savings impact and future commercial market potential are chosen for financial support through a competitive solicitation process. Inventions funded by the program have saved enough energy to light 10 million homes per year. In addition, the program offers technical guidance and commercialization support to successful applicants. Ideas that benefit the Industries of the Future, designated by the Office of Industrial Technologies as the most energy-intensive industries in the United States, are especially encouraged.

For project information, contact:

Mr. Richard Watson
Solid State Heating Corporation, Inc.
2 Custom Drive
P.O. Box 769
Old Saybrook, CT 06475
Phone: (800) 544-5182
Fax: (877) 675-4968
or
Phone: (860) 399-5434
Fax: (860) 399-6460
info@sshcinc.com

Home Page:
www.sshcinc.com

For more information about the Inventions and Innovation Program, contact:

Lisa Barnett
Program Manager
Inventions and Innovation Program
U.S. Department of Energy
1000 Independence Avenue SW
Washington, D.C. 20585-0121
Phone: (202) 586-2212
Fax: (202) 586-7114
lisa.barnett@ee.doe.gov

Visit our home page at
www.oit.doe.gov

Order # I-OT-34
September 2001